

MEIGS (J. F.)

Remarks on atelectasis ++



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ART. V.—*Remarks on Atelectasis Pulmonum, or Imperfect Expansion of the Lungs, and Collapse of the Lungs in Children; with cases.* By J. FORSYTH MEIGS, M. D., Lecturer on Practice of Medicine in the Philadelphia Medical Association.

IMPERFECT expansion of the lungs in new-born children, and collapse of the texture of these organs subsequent to expansion, are two morbid conditions which have been studied and described only of late years; and which have not, as yet, received in this country the attention which they certainly deserve.

The anatomical character of the lungs, described by the title of atelectasis pulmonum, or imperfect expansion, is found under two different conditions of things: 1st. As it exists in neonati, or young infants, who have never established completely the respiratory function; and in whom, as a consequence, larger or smaller portions of the lungs have never been invaded and expanded by the inspired air; and, 2d. As it exists in those who have, at birth, accomplished the respiratory act, but in whom, from some cause, acting at a longer or shorter time subsequent to birth, the texture of the lung has again collapsed, become impermeable to air, or, in other words, returned to its foetal or unexpanded state.

This condition of imperfect expansion of the lungs is not, therefore, confined, as was at one time supposed, to new-born children alone, but may occur also at periods subsequent to birth, and in children who had fully and completely expanded the lungs at the moment of birth. Under the latter circumstances, the condition of the affected portion of the lung is one of occlusion, obliteration, or collapse, of the pulmonary tissue.

The cases which follow are intended to illustrate the nature, causes, symptoms, and mode of treatment of this interesting change in the pulmonary structures.

The first case is one intended to show the effects that imperfect expansion produce in the neonatus. It is as follows:—

CASE I. Mrs. —, a healthy, vigorous person, was delivered, after a very rapid and easy labour, at the full term of a pregnancy which had been natural and healthful in all respects, of a male child. The infant was of full size and stature, and perfectly well developed. It came into the world, however, pale and feeble, without cries, and without any of the strong muscular movements which usually attend the moment of birth. In consequence of its feeble and weak condition, and from the imperfect development of its respiratory function, as indicated by short, rapid, and imperfect breathing, and the absence of cries, the cord was not severed until some moments after the birth; not, indeed, until it was ascertained that there was no pulsation of the umbilical arteries at a short distance from the umbilicus. After the division of the cord the infant was rubbed with brandy, and then wrapped in warm clothing. Its respiration was very imperfect, the breathing being short, feeble, and, as



before stated, entirely without cries. The colour of the surface was pale, and the extremities were cool, and the hands and feet bluish. The nurse was directed to keep the infant very warm, to place it in a position inclined towards the right side, as the one most favourable for easy respiration, and for the free action of the heart, and to keep it perfectly quiet. A few drops of brandy, in sweetened water, were directed to be given every half hour; a weak liniment of hartshorn and sweet oil was applied, from time to time, to the thorax; weak mustard poultices were applied to the feet, and the temperature of the room was kept warm and even. No decided improvement took place in its condition, except that for a few hours the colour of the hands and feet became rather more pink than at first. The breathing was short, quick, and abdominal, there being scarcely any lateral movement of the chest. After about twelve or fourteen hours, the hands and feet became very blue, and, somewhat later, the cyanosed tint extended to the face and forehead. The breathing grew still shorter and more imperfect, the blue tint increased in depth of shade, and at the end of twenty-one hours from the birth, the infant expired.

At the *autopsy*, the physiological development of all the thoracic and abdominal organs was found to be perfect. The foramen ovale was still patulous. The lungs were, however, imperfectly expanded. The greater part of the lower lobes of both lungs was of a dark-livid colour, depressed below the expanded portions, hard, non-crepitating, and not at all diminished in cohesive quality. On passing a blowpipe into the primary bronchus and inflating with the mouth, the depressed, hard, and dark-coloured portions at once rose to their natural level, became elastic, soft, and crepitating, or, in other words, expanded to their natural size, lobule by lobule, in the most beautiful manner; whilst, at the same time, their colour changed, under the influence of the entering air, from the dark and livid tint above described, to the rosy or pink tint of healthy pulmonary tissue.

No signs of pneumonia, pleurisy, bronchitis, or tubercular deposit were observed in either lung.

Remarks.—In the case just detailed, the feeble state of the infant at birth, the symptoms exhibited during life, and the death, are evidently to be explained by the failure to establish properly the respiratory function. The lungs had not, for some reason, expanded under the excitement of the atmospheric air. The only mode of accounting for this want of expansion is, by supposing that for some reason the muscular power of the child was insufficient to depress the diaphragm and to elevate the ribs to such an extent as to cause full and forcible inspirations. The vacuum, or rather the tendency to a vacuum, within the thoracic cavity, had not been sufficient to cause such an influx of air during inspiration as to overcome the contractile property of the lungs, and so cause a complete expansion of all the air vesicles, a large proportion of which had, therefore, remained empty of air, or, in other words, unexpanded.

Now this deficient inspiratory power from feeble muscularity, cannot be sought for in any state of the infant determined during gestation, since the mother was strong and vigorous, the pregnancy healthy and natural in all respects, and the child properly developed. The only plausible explanation of it is one suggested by Dr. Pepper, who received the child at the moment

of birth, and who saw it with me afterwards, and assisted at the autopsy. This is, that the placenta had probably been separated from the uterus at too early a period of the labour—some moments, we will suppose, before the child entered the world—during which time, as the connection with the mother had been cut off, it is reasonable to believe that the vital forces of the child had been so much lowered, as to deprive it of the muscular strength necessary when it entered the outer atmosphere, to produce a full expansion of the thoracic cavity, and so to effect a dilatation of all parts of the lungs.

The next case is one intended to show the effects of imperfect expansion on the health, when it exists to such an extent as to constitute a morbid state, without causing immediate or very early death.

CASE II.—*March 11th, 1850.* I was sent for to visit a child just two months old, a girl, and born of very healthy parents. The infant was attacked yesterday with a slight dry cough, which continues to-day. The child looks bright and cheerful, with a natural and placid expression of the face, and presents no symptoms beyond the cough, and a slight hooping in the respiration. It nurses well and has no fever. Ordered two drops of syrup of ipecacuanha to be given occasionally.

12th. When I saw the patient to-day, at 11 A. M., I was shocked to find her looking dreadfully ill. The face was pale and dusky, the skin coolish, the breathing irregular, short, and frequent, the eyes half shut, and moving irregularly in different directions. Upon inquiry I was told that she had not seemed so well early in the morning as on the day before, and a small dose of castor oil had been given. It was the operation of the oil apparently that had brought on the condition above described. I administered instantly a few drops of brandy, and in half an hour the child seemed quite recovered from its exhaustion; it looked bright and intelligent, but still had slight wheezing in the breathing, and a quicker rate of respiration than natural. Ordered a quarter of a grain of alum to be given in syrup every two hours.

13th. The night was quiet and comfortable, but at 9 A. M. to-day the infant began to look again very badly; the face became pale and dusky, the hands and feet cold and bluish, and the expression languid and feeble. The respiration was short, irregular, frequent, and wheezing. There was some coryza, the nostrils being dry and slightly incrustated, causing thereby some obstruction and sniffing during the passage of the air in respiration. There was very little cough, and this was dry and short.

I was much embarrassed at first as to the diagnosis of the case, it being quite clear that there must be something more than the slight coryza and bronchitis to explain the dangerous symptoms exhibited by the patient. My first thought was of intermittent fever, particularly as the parents resided in a malarious district, and as the mother had had chills while pregnant of the child, but this would not account for the excessive weakness, with the blueness of the hands and feet, and the short, irregular respiration. My next thought was atelectasis, and upon careful questioning I obtained the following information in regard to the state of the child at birth, and up to the time of my first visit, when it was, as stated, just two months old.

The child was born in a feeble condition, so that the attendant was obliged to throw cold water upon it, and blow strongly into the face before respiration could be established. After these measures, however, it breathed well, with the exception that the respiration was rather short and frequent, and it cried

loudly. For several days after the birth the hands and feet had a bluish or cyanosed tint, so that the accoucheur informed me that he watched the child with some anxiety during that time, and it was observed to breathe shortly. Gradually, however, the blueness passed away, and the child has seemed well since, except that the mother thought it always breathed rather short and imperfectly. It grew reasonably well, though at a less rapid rate than is usual, and decidedly less so than the previous children of the mother.

I concluded that the case was one of collapse of the lung, occurring in a child who had had at birth imperfect expansion of the lungs, and in whom those organs had never been fully and completely dilated. The collapse depended, no doubt, on the impediment presented to full inspiration by the slight coryza and bronchitis, with which the patient had been attacked, and I believe, also, upon a disposition to periodical fever, received from the mother during gestation. It has already been stated that the mother suffered from intermittent fever during her pregnancy.

The coryza was treated by enveloping the head in a light flannel cap, and by passing frequently a small camel's hair pencil, moistened with glycerine, into each nasal passage. Four drops of brandy were given in two teaspoonfuls of breast milk (the child could not suck) every half hour. A weak mustard poultice was applied to the front and back of the thorax, and a mustard foot-bath administered.

In the afternoon the condition of the patient had improved very decidedly.

14th. Passed a very good night, nursing well several times. At 9 A. M. began again to flag very much, and at 11 A. M. looked very ill, the face being pale, and the forehead, hands, and feet deeply bluish. The nails especially were of a deep-blue colour. At the same time the hands, feet, and arms were cold; the respiration was very frequent, irregular, sometimes gasping, and attended with considerable wheezing, owing to abundant dry and subcrepitant râles over the upper parts of the chest. There was but little cough, and it was short and dry. There was also much drowsiness, and no disposition to nurse. Coryza about the same. The brandy to be continued as may be necessary; the nasal passages to be moistened frequently with a brush dipped into clear water, and at longer intervals with one moistened with glycerine.

In the afternoon there was no improvement, except that the coryza was somewhat better. Believing that the case was, as above stated, complicated with a disposition to intermittent fever, I ordered an eighth of a grain of quinine to be given every two hours, in syrup and water; the brandy to be persevered in; the front and back of the chest to be gently rubbed every three hours with a liniment of amber oil and sweet oil, containing two parts of the latter to one of the former.

15th. Some improvement towards the afternoon, the colour of the skin being less pale and bluish, and the hands and feet warm. The inspirations are regular, and at the same time deeper and fuller. The cough, which has been very unfrequent hitherto, is now more frequent, stronger, and slightly loose. The subcrepitant râle continues. The pulse is fuller and stronger. The coryza is much better, so that the nostrils are quite clear.

Continue the quinine every three hours, and give with it an eighth of alum. The brandy to be given as may be necessary.

16th. Patient continues to mend; cough strong, frequent, and loose; coryza almost well; temperature natural; colour very good. The act of nursing, which, on the 13th, 14th, and 15th, was very difficult, is now becoming easy and frequent. The alum and quinine to be continued as before. The brandy to be suspended.

17th and 18th. The improvement continued. The respiration was regular and easy, the cough frequent and loose, and there was much fine râle over the chest. The colour of the surface had become natural, except that it was still too pale; the temperature of the skin was sufficiently warm. The act of suckling was performed without any difficulty.

The flannel cap was removed from the head to-day.

19th. The child was well except a little cough, and some very slight and fine râle over the front of the chest. The alum and quinine were suspended, and one drop of syrup of ipecacuanha, one of paregoric, and two of sweet spirits of nitre, directed to be given every two hours.

From the date of this sickness up to February 1851 (a period of eleven months), the subject of the above case continued to have very weak and imperfect health. It had several attacks of intermittent fever, perfectly well marked, but of slight severity, and readily overcome by quinine or extract of cinchona. It had also for a considerable period a hard, dry, laryngeal cough, always brought on and exasperated by the act of deglutition. During this cough the fauces always presented a very red and roughened appearance, and the tonsils were much swelled and very red. The cough was treated with small doses of paregoric and syrup of ipecacuanha, and by touching the throat with a weak solution of nitrate of silver. Under this treatment, and with very warm clothing, and careful avoidance of cold and damp, the cough several times ceased, but would return upon the slightest exposure, and in spite of every precaution. There was also an attack of catarrh, but it was mild, and soon passed away.

The mother continued to suckle the infant until it was about ten months old. It is proper to state, however, that during lactation it was necessary to give some additional food, which consisted, as it did also after weaning, of cows' milk containing wheat flour and a small portion of gelatine. Broths were also given at times. The quantity of food taken after weaning was generally large, amounting to three pints or two quarts per day, an amount quite sufficient to carry on abundantly well the development of most children at the same age. In spite of this, however, and of every advantage which the most careful hygienic treatment, and the most tender and unceasing watchfulness could supply, the growth of the body and mind were both very slow, so that, at the age of thirteen months, the infant was not larger, nor its intellect more developed, than in most hearty children at nine or ten months. But not only was it small in stature; its limbs were very small and thin, and its muscular power feeble, so that it had never attempted to creep or walk, nor even to bear its weight upon the limbs. The lower extremities were very small, and had not strength sufficient to bear the weight of the body, as they instantly gave way on the attempt being made to cause the child to stand. Still there was no paralysis, as they were moved freely when the child was sitting upon the lap. During all this time, too, the respiration of the child was habitually short, high, and more frequent than natural, though not attended by any effort.

On the 9th of February, 1851, the child was suddenly attacked with violent, frequent, dry, and excessively painful cough, each spell of coughing giving rise to crying, and an expression of acute suffering on the countenance. Fever and quick and laboured breathing came on at the same time, and the case presented every symptom of severe illness. The diagnosis was pleurisy, though the disease could not be detected by physical examination at the first visit. On the second day, however, it was manifest that the attack was one of pleurisy of the right side, the percussion being dull over the lower part of

that side behind, the respiration feeble and slightly blowing, and there being a total absence of râles.

After a few days the percussion became dull over the lower half of the right side, whilst over the same region there was absence of all respiratory sound. At the end of a week there was neither sonorousness on percussion, nor any sound of respiration, below the clavicle in front and below the upper part of the interseapular space behind.

The case was treated at first by an application of dry cups over the right side, with minute doses of calomel, and with small quantities of paregoric to lessen the painfulness of the cough.

The child soon grew very thin and debilitated, and lost all appetite. The acute symptoms subsided in great measure after ten days, though a hectic fever, with particularly well marked exacerbations every other day, continued up to the moment of death.

At one time a slight improvement occurred in the state of the patient. The appetite returned somewhat; the nights were better; there was but little suffering, and the child was more comfortable. But the cough continued, though it was much less frequent. It also retained its perfectly dry, harsh character, there being not the least well marked looseness at any time. The breathing also remained short and frequent, though it was not so laborious as at first. During this time also the breathing exhibited the characters which are always well marked in collapse of the lung. It was almost entirely abdominal, there being scarcely any lateral movement of the chest. It presented also the character described by Dr. Rees of London, which is a peculiar sinking inwards, or depression of the walls of the chest during *inspiration*. This was perfectly well marked, and was so different from the movements of ordinary respiration as to draw attention the moment the lower part of the thorax was uncovered and inspected.

The treatment after the cupping consisted at first of a blister, and at a later period in the use of liniments to the thorax, and still later in the application of diachylon plasters to the side. The internal remedies were extract of cinchona, and iodide of iron in sarsaparilla syrup. The diet, after the acute symptoms had diminished, consisted of arrow-root gruel made with milk, and chicken soup. Brandy and wine whey were given occasionally, usually in the morning, prior to the febrile exacerbation.

In March the child grew rapidly worse. It became very weak and prostrate, and had frequent attacks of exhaustion. The cough was dry and troublesome, and the respiration laboured and frequent. It became much emaciated, and finally died on the 10th of the month (fourteen months old), after having had some slight convulsive movements.

Autopsy. The right pleural sac was filled with thick, yellow, inodorous, and perfectly well concocted pus. The amount must have been about six ounces, though, as it was not measured, it is impossible to give a precise statement. The lung was pushed backwards against the side of the spine, and was flattened, dense, and entirely impermeable to air.

The left lung presented in the inferior two-thirds of the lower lobe, all the appearances usually expressed by the term *carnification*. This portion of the lung was depressed below the level of the surrounding surfaces, and looked, therefore, smaller than the upper and expanded parts of the organ; it was of a livid or purplish colour, dense, hard, and non-crepitating on pressure. It did not break down under the finger, nor was it easily penetrable by the finger, as is the pulmonic tissue when really inflamed. The expanded portions were soft, elastic, crepitating, and of a healthy rosy colour.

On inflating the lung, by means of a blowpipe passed into the primary branches, the *whole* of the dense and livid part rose up gradually and slowly, lobule by lobule, to its natural size and level. It was a most convincing and beautiful demonstration of the real nature of the lesion. As lobule after lobule expanded under the repeated and powerful expiratory efforts of my friend, Dr. E. Wallace, who was making the examination, each part, as it dilated, resumed under the influence of the entering air, its healthy rosy red tint, and became at the same time elastic and crepitating. Dr. Wallace assured me that he was obliged to use a degree of force much greater than he ever employed to inflate healthy adult lung, and he succeeded only by several distinct and renewed attempts. I doubt not, therefore, from this fact, and from the marked density and compactness of the collapsed portion, that the lesion had been of long standing, probably from birth.

The upper lobe, and the superior part of the lower lobe were quite healthy. They presented no trace of tubercle, nor any sign of pulmonic or pleuritic inflammation.

The heart was healthy, except a slightly patulous state of the foramen ovale. Abdominal organs healthy.

Remarks.—That the case just related was one of true atelectasis pulmonum there can be, it seems to me, no reasonable doubt. Some persons, after reading the above history, might be disposed to lay more stress on the intermittent fever, under which the child evidently laboured at times, than I have done. But, inasmuch as the child remained, at one time, for some months without any sign of periodical disease, and continued to exhibit during that period, the same characters of languor, feeble growth, and short, imperfect respiration as before, I cannot regard the intermittent fever as having any more influence over the health of the patient, than as tending, by its depressing influence on the vital powers, to keep up the state of constitutional debility under which the child laboured.

I believe it to be highly probable that the infant never fully expanded the lungs after birth, and that the condition of collapse found in the left lung at the autopsy, had existed more or less completely from the moment of birth. I found this opinion upon the facts, that the child was so feeble when born as to make it necessary to stimulate, artificially, its respiratory movements; that its respiration was short, frequent, and rather imperfect, from that time; and that it presented, for some days after birth, the bluish tint and low temperature of the hands and feet, which usually accompany imperfect expansion of the lungs; and, that during the attack of bronchitis which it had had at the age of two months, it exhibited symptoms of exhaustion, of partial asphyxia, and of embarrassed respiration, more severe and threatening than could be accounted for by the amount of catarrhal inflammation present in the case. Moreover, the whole history of its life shows that it was labouring from the moment of birth, under some deep-seated, serious, and persistent disorder; a disorder sufficiently grave to impede the proper development of its physical and moral qualities, and to give to it at all times the appearance of a feeble, puny, and imperfect creature. Now, if disease of a serious nature must have

been present, where did it lie? Not in the brain, for, though that organ could not be examined at the autopsy, it was clear that the disease was not there, from the fact that there had never been any disorder of the senses, any paralysis, any deformity or distension of the cranium; and, because, though the intelligence was dull, it was not absent, but merely imperfectly developed in consequence of the feeble development of the whole organization of the infant. The disease was not in the abdominal organs, since the digestive function had always been well and regularly performed. Nor was it in the heart; for that organ was healthy, with the exception of a slightly open state of the foramen ovale, a condition always found in congenital atelectasis, and produced, or rather maintained, no doubt, by the obstruction to the pulmonary circulation caused by the density of a large portion of the parenchyma of the lungs. It must, therefore, have been in the lungs, as was supposed before death, and as was proved by the post-mortem appearances.

Before quitting this case to pass to the next, I wish to call the attention of the reader, with some particularity, to one of the symptoms existing towards the close of the case. This symptom is one which I first saw described in an extract from a small work on *Atelectasis Pulmonum*, by Dr. George A. Rees. It consists in a peculiar movement of the chest during inspiration. The walls of the thorax sink inwards, towards the mesial line, during respiration, instead of extending outwards as they do in healthy respiration. This falling or sinking inwards of the ribs during inspiration depends upon the fact that the vacuum, or rather disposition to a vacuum, caused by the descent of the diaphragm, is not filled up as it should be by a rush of air into the lung. On the contrary, the lung, being collapsed and inexpansive from the obliteration of its air-cells, cannot enlarge sufficiently to fill up the space left vacant by the descent of the diaphragm, and the walls of the chest are, therefore, driven inwards during the act of inhalation by the pressure of the atmosphere upon them. This depression occurs, not over the whole of the thorax, but at its base, about on a line with the muscular attachments of the diaphragm, so as to cause a kind of constriction or indentation at that point. The muscles, whose office it is to elevate the ribs, and to expand the transverse capacity of the thorax during inhalation, still fulfil their office for the upper regions of that cavity, but are unable to lift the walls of the lower part of the cavity against the pressure of the atmosphere, when the space within can no longer be readily entered by the atmospheric air at the instant the vacuum is caused by the respiratory movement.

In the case just related this symptom was very strongly marked, and gave to the thorax a very singular and striking appearance. The base of the thorax was indented, on both sides, by a deep gutter or depression, which remained depressed and unchanged during the inspiratory movements, or which, indeed, rather became more visible and distinct during these motions, so that the chest presented the curious spectacle of dilatation or expansion in its upper parts during inhalation, and of contraction or collapse at its base.

The following case is intended to show the symptoms which result from atelectasis, when it occurs subsequently to birth, the collapse of the air-cells taking place after they have been once properly expanded by the establishment of respiration.

CASE III.—The subject of this case was a boy, who, at birth, presented every appearance of health and vigour, and whose respiration was established fully and completely. The mother having proved an insufficient nurse with her previous children, a strong and healthy wet-nurse was procured. For two weeks everything went well, except that the infant had an attack of slight aphthous sore mouth, which, however, was passing off, when the nurse was suddenly seized with typhoid fever, and the child was weaned, and for a few days fed on artificial diet. During these few days the aphthous sore mouth grew worse, and a diarrhœa consisting of loose spinach-green stools made its appearance. When the infant was eighteen days old, another wet-nurse was obtained. The infant took the new breast without any difficulty, but the diarrhœa, amounting to three or four loose stools a-day, continued, the mouth remained sore, and the child lost flesh.

For a few days before the atelectatic symptoms were developed, the mother observed that the cry of the child was weaker than usual, so much so as to make her uneasy, though there were no other signs of sickness than what I have mentioned. On the twenty-fifth day after birth it was observed that the child coughed and sneezed several times, and had some stuffing in its breathing. On the evening of that day, owing to some accident, one of the gas-burners in the chamber, occupied as the nursery, was left open, and a sufficient amount of gas escaped to contaminate the air of the room. During that evening, the stuffing in the breathing above referred to continued, and the child slept more heavily than usual. At 9 P. M., it sucked as usual. Between 11 and 12 o'clock, there was noticed a slight whistling, a kind of stridor, in the respiration, the skin became suddenly a little bluish, and a slight convulsion followed immediately. Several times between that occurrence and 4 A. M. of the next day, there were convulsive seizures, which were preceded and followed by deep blueness of the mouth, hands, and feet. The convulsive movements consisted in strong retractions of the head, in backward bending of the whole body, and in stretchings or extensions of the arms, whilst the fingers and thumbs were flexed into the palms. The under lip was drawn inwards; the whole mouth had a stiffened and unnatural look; the eyes were strongly up-turned. Towards 4 A. M., the infant slept easily without any movement, but there was a well-marked stridulous sound in the inspirations. Throughout the night the least disturbance of the child, lifting or nursing it, or changing its position, appeared to distress it, and sometimes brought on the convulsive attack. The least sound also, or a touch even, made it start at once. After some of the attacks it seemed to be dying, as it would lie pale and expressionless, and almost without breath; in fact, its respiration was sometimes entirely suspended for several moments. There was no vomiting and no stool during the night. The child had been heard to cough once or twice during the day, and had sneezed a good deal. There was no cough during the night.

I was called to see the case on the following morning, Aug. 13th, 1849, at 7½ o'clock. I found the infant still very ill. The attempt to make it suck brought on a fit at once. In the attack (which resembled, I was told, those of the night before), the surface became bluish, the face and hands particularly, being very deeply tinted. The hands were cold. The respiration was feeble, imperfect, and slow, all the time; the inspiration was evidently partial, short,

and with very little power, and, just after the convulsive paroxysm, was entirely suspended for some seconds.

No treatment beyond the use of a warm bath had been employed prior to my visit. The treatment directed by myself was as follows: three drops of brandy were to be given every half hour in two teaspoonfuls of breast-milk; the infant was to be comfortably wrapped in a number of warm blankets; vessels filled with hot water were to be applied to the feet; the child was to be placed on the *right* side, with the head and shoulders elevated; and, lastly, profound rest was rigidly enjoined. The infant was to be disturbed in no way except for the administration of the milk and brandy. Afterwards, as the administration of the brandy and milk brought on the convulsion, the doses were directed to be given only every hour.

At 9 A. M., the administration of the milk and brandy brought on a violent spasm, attended with deep blueness. There were, however, in this paroxysm some loud cries, which were the first since the night before. At 10 A. M., the spasm was much slighter when the milk was given; at 11 A. M., it was still less marked, and unattended by blueness; and at 1 P. M., there was no spasm, though three teaspoonfuls of the milk were given. The colour of the surface, at this time, was perfectly good, rosy red, and the palms of the hand pink; the hands were warm, and the ears naturally coloured. The expression of the face was placid and natural; the contraction about the mouth, and the rigid indrawing of the lower lip, had disappeared.

The treatment to be continued.

August 14th.—This morning the child looked drowsy and feeble; it had, when nursed, violent screaming spells, which were unattended, however, by blueness or convulsions, and I thought it much better. In the course of the day it roused up from its state of dulness, looked about intelligently and naturally, and, in the middle of the day sucked perfectly well, and, with the exception of weakness, paleness, and an expression of exhaustion, looked well.

During yesterday, the whole face, the arms, and particularly the right arm, on which it had been lying, looked puffed and swelled. The right arm was unquestionably infiltrated with serous fluid, and that to a great extent, as it was very considerably swelled, and had the peculiar doughy, inelastic feeling, with slight pitting, which accompanies that condition.

In the course of this day, after the violent screaming spells, and of course after the complete restoration of the respiration and circulation, all this swelling disappeared, and the child looked thin and delicate, as was to be expected after severe illness. Was not this the first stage, the beginning of the induration of the cellular tissue or scleremia, which is so fatal in foundling hospitals?

After this time the child recovered its previous health gradually and steadily, and is at this moment (October 1851), a fine, healthy boy.

Remarks.—The case just described is interesting for several reasons, to wit, because it shows how suddenly the condition of atelectasis may occur in a child whose respiration previous to the attack had been quite natural. It shows that blueness of the surface, coming on suddenly in an infant, must not be supposed to indicate, in all cases, a defective structure of the heart; and, lastly, it shows that a very simple treatment was successful in relieving the symptoms.

The onset of the symptoms was, in this case, extremely sudden and unexpected. The child was born at full term, and was in all respects healthy and

well developed. It is seized, however, soon after birth, with slight thrush, and, just as that disease is passing away, the wet-nurse is taken sick, and it becomes necessary to employ artificial nourishment for a short time. The thrush now grows worse, diarrhoea sets in, the child loses flesh, and of course strength, and, though another nurse is procured on the eighteenth day, the cry of the infant is observed by the mother to be weak and feeble for several days before the atelectatic symptoms make their appearance. On the twenty-fifth day after birth, the patient is observed to have a very slight cough, and to sneeze several times; and in the evening it is seized suddenly with convulsions, attended with marked cyanosed tint of the surface, and with short, imperfect, and slow respiration.

Previous to this time there had been no sign whatever of cardiac imperfection, and the period at which the foetal openings of the heart are usually closed, had long passed. It is impossible to suppose, therefore, that the symptoms depended on any admixture of the two kinds of blood. Nor is it possible to suppose that the obstacle to the circulation which caused the blue colour of the skin, could have existed in the heart, since there is no condition of that organ that could have caused so transitory an attack of cyanosis as this proved to be. The attack was not one depending upon gastric or intestinal irritation, as some might be inclined to suppose, since neither the thrush nor the diarrhoea present in the case, were sufficiently severe to give rise to such dangerous and repeated convulsive seizures as those I have described. Moreover, the convulsions were different from those usually attendant upon gastro-intestinal irritations; there was more stiffening and rigidity of the body and limbs than is commonly seen in the latter kind of cases; there was more blueness, and especially a more lasting blueness; and lastly, there was greater derangement of the respiratory function.

The case was evidently, it seems to me, one of atelectasis, in which the symptoms depended upon imperfect performance of the hematosic function. The child had been debilitated by the loss of its proper nourishment, and by the action, upon its economy, of an attack of thrush and diarrhoea. In this weakened condition it is seized with some slight, very slight, catarrhal symptoms; the atmosphere which it breathes is for a short time impregnated with the gas escaping from a gas-burner carelessly left open by a domestic, and shortly afterwards portions of the lungs collapse, by which not only does a certain proportion of the blood fail to be oxygenated for want of a sufficiently extensive aerating surface, but there is occasioned a positive obstruction to the circulation of the blood through the lungs, and a consequent accumulation of black blood in the venous system of the body. Under this condition of things—deficient arterialization of the blood, and accumulation of venous blood in the nervous centres—it is evident that the functions of the nervous system must be imperfectly performed, the supply of nervous power must be insufficient, and we observe as results, irregular, imperfect, and convulsive muscular movements. So irritable does the nervous system become, that

convulsions are brought on by the slightest disturbance or irritation, as by a change of position, and by the effort of deglutition.

The immediate cause of the collapse of the pulmonary vesicular structure was, no doubt, the general debility of the child, and the obstruction to the entrance of air into the chest, occasioned by the catarrhal condition of the upper air-passages. That general debility often causes collapse of the lungs in young children, has been sufficiently proved by those who have studied the subject, since that morbid condition almost always occurs in subjects broken down by exhausting diseases, in those weakened by the action of unwholesome hygienic influences, or in those who come into the world feeble and imperfectly developed. Moreover, what can be more reasonable than the supposition, that general debility will affect the muscular system by which respiration is carried on, as well as the other muscular systems of the body? And if so, it must follow that the act of inspiration, and consequently expansion of the lungs, produced by the muscular dilatation of the thoracic cavity, will be weak, feeble, and imperfect, in comparison with what occurs in health.

CASE IV.—In the spring of the present year I attended a lady in her confinement, who gave birth at full term to a healthy boy, weighing between nine and ten pounds. The child was perfectly well in every respect when born, and gave us no disquietude up to the sixth day after his birth. On that day he cried a good deal in the morning. At one o'clock in the day he began to moan, and seemed distressed, so that the mother asked whether he was not ailing. Just before 2 P. M., whilst in the nurse's lap, he ceased moaning, became bluish, and seemed to lose his breath, so that the nurse thought he was dying. She immediately placed him in a warm bath, and sent for me. The bath restored his respiration, the blueness passed off, and he looked much better, though he continued to breathe irregularly and unevenly. A short time after this he again became blue, breathed slowly and irregularly, but had no spasm. A neighbouring physician was called in, and ordered a repetition of the bath, and a bottle of medicine of some kind. Shortly before four o'clock, P. M., I arrived, and found the child lying upon the lap of the nurse, and just beginning to have another one of the paroxysms which had caused so much alarm. The whole of the exposed surface, the head and neck, and the arms, hands and feet, were bluish. As I looked at the patient, the colour of the skin, especially that of the head and neck, became more and more blue, and at last almost black, so that the child looked more the child of a black than of a white woman. At the same time the head was drawn backwards and to one side by a tonic muscular spasm; the arms and legs were extended and rigid, and the fingers were flexed into the palms of the hands. The respiration was slow and imperfect, and the child seemed as though about to die in the convulsion. This condition lasted for some moments, after which the convulsive state subsided, but the child remained bluish, and in a state of stupefaction.

There was nothing in the history of this case that allowed me to refer the symptoms to any other cause than obstruction to the pulmonary circulation from collapse of the lungs, and, probably, a reopening of the foramen ovale from the congestion of the right side of the heart, brought about by the partial arrest of the current through the branches of the pulmonary artery. There was no derangement of the digestive function, nor was there any sign,

even the least, of a catarrhal condition to explain the symptoms. I concluded, therefore, that the case was one of sudden collapse of some portions of the lungs, with consequent congestion of the right side of the heart, and, perhaps, reopening of the foramen ovale and admixture of the two kinds of blood. I told the mother that there was no indication for any medicine—that all we could do was to place the infant on its right side, on an inclined plane of pillows, in order to let the heart have full play, and to give every half hour a few drops of brandy in a teaspoonful of breast-milk. He was not to be disturbed from this position for several hours for any object whatsoever.

My directions were accurately complied with. In a very short time the colour of the skin began to improve, and, though there were two slight paroxysms of convulsive stiffening, with increased depth of the cyanosed tint, between this time and the evening, I found the child much better in all respects at my evening visit. There was still, however, some blueness, with irregular, short respiration, and with a continuation of the dulness and inattention. During the early part of the night, the breathing was short and uneven and attended with some moaning; but, about 4 A. M., these symptoms disappeared, the child fell into a natural, easy sleep, lasting until 7 A. M., when it waked, nursed without any difficulty, and seemed quite well.

The child recovered perfectly, and is now (October 29th) in fine health.

Remarks.—The treatment in this case was exactly the same as that employed in the previous one. It consisted in the position on the right side, in perfect quietude, and in the exhibition of a few drops of brandy in breast-milk from time to time. No drug whatever was given, as there was no indication for the exhibition of any with which I am acquainted. The position on the right side, on an inclined plane, with the head and shoulders elevated at an angle of about 45° , and the absolute quiet maintained for several hours, constitute the treatment recommended, and often successfully practiced, by my father, Prof. C. D. Meigs, in cases of cyanosis neonatorum. Its good effects in these cases are supposed by my father to depend on the fact that the septum auricularum becomes, in this position of the body, horizontal, so that the blood in the right auricle must rise against gravity in order to pass through the foramen ovale; while, at the same time, the valve of that opening is disposed to fall down, by its own weight, and close the foramen, and is, moreover, pressed downwards by any blood that may enter the left auricle from the pulmonary veins. This explanation applies, of course, only to cases in which the cyanosis is supposed to depend upon the transmission of venous blood from the right auricle, through the foramen ovale, into the left auricle. In the cases related above, the position mentioned was chosen because it is the one which seems most favourable to a full and easy performance of the respiratory and circulatory functions. The position towards the right side leaves the left side free and unembarrassed, so that the heart can act with the greatest possible freedom, while the partial elevation of the head and shoulders renders the movements of the chest much more easy and complete than when the body is lying on a plane surface. The perfect quiescence so strictly enjoined is a very important part of the treatment, for I have always found that moving the child, shaking it, or dandling it upon the lap

(which are the procedures generally employed by the nurse to bring it to), have only aggravated or kept up the alarming symptoms. Indeed, I have known the slightest movement, even the effort of swallowing (as in Case III.), to bring on convulsive movements.

Collapse of the lung is met with, not only as a congenital affection, or as a post-natal one, occurring a few days or weeks after birth, but it has been observed in children of a much more advanced age. This latter is so important a form of imperfect expansion of the lungs, that I shall beg the reader's attention to a few remarks upon it.

It was not until the year 1844 that the frequency and importance of collapse of the lungs in older children was brought prominently before the medical profession. In that year, MM. Legendre and Bailly published their researches on this subject in the *Archives Générales de Médecine*. Those gentlemen have shown clearly that, in many cases of pneumonia and bronchitis in young children, a collapse of portions of the lung constitutes a most important part of the diseased condition. They go so far, indeed, as to assert that nearly all the cases of so-called lobular pneumonia are, in fact, cases of bronchitis attended with collapse of a larger or smaller number of the lobules of the lungs.

It is only necessary to read the later essays on the diseases of children to become convinced that a separate and distinct organic affection of the lungs has been heretofore confounded with pneumonia. This organic affection has been shown to be a true collapse of the air-cells, by the very simple experiment of inflating the lungs after death, under which operation the parts of the lung that are collapsed, and which have been heretofore supposed to be affected with lobular or lobar pneumonia, or chronic pneumonia, are seen to expand to their proper size and height, to lose their unnatural density, to regain their proper colour, and, in effect, to be restored, in some instances completely, in others partially, to their physiological and healthful characters. The peculiar character of the lesions constituting this affection had drawn attention for some time before it was properly understood. MM. Rilliet and Barthez had described, in their article on pneumonia, a condition of the lung called *carification*, which differed so much from ordinary pneumonia as to create a great difficulty in their minds as to its real nature. So much were they struck with its appearance that they were on the very verge of detecting its real nature; in fact, they did suggest its real nature, but were so possessed with the idea that it must be the result of some inflammatory action as to neglect to pursue their own suggestion, and to endeavour to explain the condition on the ground that it was "one sort of termination of pneumonia or chronic pneumonia." The following passage, quoted from their first volume, page 74, will show how closely they approached the truth: "The first idea that enters the mind on examining this tissue (*carification*) is, that it resembles the lung of a fœtus that had never breathed; we would be inclined to say that the pulmonary vesicles had not yet been dilated under the influence

of the thoracic expansion, and had not, therefore, admitted air into their interior. Or, rather, it would seem as though they had been obliterated after some attack of disease, perhaps of inflammation, without, however, remaining engorged, and after having lost the power of dilatation." I might cite other authors who have been struck with the peculiar anatomical appearances met with in many supposed cases of pneumonia and bronchio-pneumonia in young children, but am prevented by the want of space for greater detail.

The lesions found in collapse of the lungs in older children, are much the same as those already described in the accounts of the above cases. As this condition of the pulmonary texture has, however, often been mistaken for pneumonia, I will mention here the more important distinguishing features of the two alterations. In the first place, the lung presents a different aspect externally; in atelectasis the altered portion is smooth and shining, and is depressed below the general surface, so that it has a shrunken appearance, and it is of a purple or violet colour; in pneumonia, the surface is dull and often roughened by pleuritic inflammation, it is of a brownish-red colour, and, instead of being diminished in volume, is distended. In atelectasis the tissues retain wholly, or in great degree, their natural cohesive qualities; they are not readily penetrable by the finger, nor are they easily torn, whilst in inflammation they are softened, friable, and easily torn or crushed. In atelectasis, the cut surface exhibits no granulations. In pneumonia, the granulated appearance of a cut surface is constant. Atelectasis is usually found in both lungs; pneumonia, except in the true lobular form, is nearly always confined to one. The secondary lesions of pneumonia, the pleuritic and bronchial inflammations, are absent in atelectasis, except where the latter occurs, as it often does, in connection with, and as a complication of pneumonia and bronchitis. And, lastly, in collapse the altered portion can be more or less completely inflated by artificial means; whilst in inflammation the hardened and altered parts resist all attempts at inflation.

The most important matters for consideration in a practical view of this form of collapse are its causes, symptoms, and mode of treatment.

Its two chief causes are general debility, and the existence of an obstruction to the entrance of air into the vesicular structure of the lung. A child who is either born weak and feeble, or who becomes so in after years, from exposure to unfavourable hygienic conditions, or from attacks of exhausting diseases, loses the muscular power which is necessary to effect a complete and efficient dilatation of the thoracic cavity; the inspirations, under these circumstances, are short and imperfect, and the portions of lung most distant from the principal air-passages, not being reached by the inspired air, remain in an unexpanded or collapsed state.

The other cause referred to, the existence of an obstruction to the entrance of air, occurs in bronchitis, bronchio-pneumonia, and pneumonia, in which diseases the presence of morbid secretions in the bronchia must impede more or less the transit of the inspired air through those tubes. But it is probable

that this result is seldom produced so long as the muscular actions of respiration retain their full force and vigour. When, however, these actions are enfeebled and diminished in force by a state of debility and prostration, it is easy to understand that the more distal portions of the vesicular texture of the lungs will fail to receive their due proportion of air; since there will here be two conditions at work to bring about this result: namely, an impediment in the air-tubes, and a deficiency in the power of inhalation.

The most important symptoms indicative of the presence of this kind of collapse, are the sudden occurrence of short, high, and rapid breathing, with dulness on percussion, feebleness of the respiratory sound on auscultation, and with more or less mucous or sub-crepitant râle. At the same time the general symptoms are those of exhaustion and want of action, rather than those which accompany pneumonic or bronchial inflammation. When the collapse occurs in the course of bronchitis or pneumonia, there will be a sudden increase of the dyspnoea, and a development of asphyctic phenomena, without a corresponding increase of the febrile symptoms. I have met with several cases in which, after the symptoms of bronchitis or pneumonia have subsided at the usual time, and the patient has improved for a while, the above symptoms have made their appearance; the breathing has become again rapid and oppressed; the surface has become pale, or slightly bluish, and cool; the cough has remained stationary or even diminished in frequency; and the child has grown dull, heavy, and inattentive. Formerly I was often very much at a loss to explain the symptoms; of late years, however, I have not hesitated to regard such cases as instances of collapse brought about by the state of debility following the primary acute attack, and have found them to recover under the administration of brandy, Huxham's tincture of bark, nourishing diet, and the use of mustard applications, or stimulating liniments, to the surface of the chest.

A consideration of the causes of this kind of collapse, and of the symptoms which accompany it, will at once point out its proper mode of treatment. The state of general debility on which it depends, the pale, slightly asphyctic tint, and coolness of the cutaneous surface, the muscular weakness, the frequent and feeble pulse, and the drowsy inactive condition of the intelligence, all mark at once the necessity of withholding exhausting modes of medication, and of resorting to stimulants, tonics, nourishing diet, and the different kinds of rubefacients and mild revellents. The patient should be put upon the use of small doses of brandy, of tincture of bark, or of quinine, and upon a diet of milk and broths; while, at the same time, the surface of the thorax ought to be gently irritated by applications of mustard poultices, or by frictions with hartshorn or oil of amber, and sweet oil.

The following case is intended as an illustration of the above remarks upon the form of collapse of the lung occurring in children beyond the age of early infancy.

CASE V.—I was called, on the 13th of February, 1849, to take charge of a child who had previously been under the care of another physician. The

patient was a girl between two and three years of age, born of healthy parents, both of whom were living, and were in affluent circumstances. The child had been brought up at the breast, and had been hearty and strong, with the exception of an attack of dysentery at the end of the first year, until the date of the present sickness. A little more than two months before my visit, the illness began with an attack of pneumonia, in the early part of which there had been a violent convulsive seizure, followed by very dangerous illness lasting for many days. The child then slowly and gradually got better; remaining, however, very weak, pale, short of breath, without appetite, or with a very capricious one, and with frequent cough, up to the date of my first visit.

Some time before my first visit, other children in the house had been attacked with whooping-cough, and it was then suspected that the subject of this case was being seized with that disease. I found her in the following condition: There was very little heat of skin, generally none, and often the surface was too cool and moist; the pulse was frequent, from 140 to 150, and soft and compressible; the respiration was frequent, but varying a good deal, and yet not laboured. The child was weak; she would walk slowly from chair to chair, but never ran about, and soon became tired and exhausted. She was very pale, white, except that now and then a slight hectic flush glowed upon the cheeks for a few hours. The least exercise caused rapid and violent action of the heart, and often occasioned free perspiration. There was a frequent, strong, catarrhal cough, especially at night. This cough was sometimes hard, at others loose, and was unattended by obvious expectoration. The appetite was very capricious, and the quantity of food taken small. The bowels were loose, there being from two to four stools a day; the dejections were thin, soft, and of a dark-brown colour. The temper was irritable, and the child difficult to manage, causing great difficulty in the administration of remedies. The nights were restless, the sleep being broken both by mere jactitation, and by coughing, which latter was often very troublesome.

Auscultation revealed loud sub-crepitant râle, all over both sides behind, and particularly over the left. On the left side the respiratory sound was more feeble than on the right, and over the same part there was some bronchial respiration. The percussion was much duller on the left than on the right side.

The treatment directed was twenty drops of brandy three times a day; twenty-five drops of paregoric every night, to be repeated if necessary; and the diet to consist of milk, hard gingerbread (she would take no wheat bread, or any kind of pap), oysters when she would take them, soup, and ice cream.

By the 22d, the cough had assumed all the characters of pertussis, with the exception of the hoop; the appetite, which had been capricious, was now feeble, the child refusing everything but about two to four ounces of milk a day, two or three small ginger cakes, and sometimes three or four oysters; no meat, or bread, or rice, or eggs, could she be induced to take. On the 20th, I ordered a grain of quinine to be given three times a day, and a large mustard poultice was to be applied to the chest every morning and evening.

23d.—Patient mending; has had a very good night; looks better, and has at times a slight tinge of colour in the cheeks, and is a little stronger. Respiration continues very frequent (50 to 60), and accompanied by a distinct râle all the time; skin cool and moist; a little more appetite; bowels in better order, there being but two stools daily, and those more natural; takes the brandy pretty well; the quinine causes sick stomach; physical signs as before.

To continue the mustard applications, the brandy, and the diet as above. R. Liq. ferri iodid. gtt. xlviii; syrup. sarsap. comp., aquæ fluvial., aa ʒiss. M. A teaspoonful every two hours.

March 1st.—The case has been going on pretty well since the last note. The hooping-cough has been slowly aggravating, but, notwithstanding, the strength has not diminished, and the appetite has been rather better. The oppression has been about the same; so also the pulse. The surface has continued pale usually, coolish, and disposed to perspiration, especially upon any exertion. The stools number, generally, two a day. Percussion as before; much sub-crepitant râle over the whole dorsum of the chest.

Yesterday the child was taken out of the room and down stairs for the first time. In the evening, she was not so well; the pulse rose to 150; the respiration was 50, short, and attended with much wheezing; the cough was troublesome, the paroxysms being frequent and violent. This morning, at half-past five o'clock, the nurse observed her to be moving about in bed, and moaning, as though about to cough, when, suddenly, she was seized with a slight convulsion, in which the eyes were rolled upwards, the body and limbs became stiff, and she was entirely unconscious. The attack lasted but a few moments, and when I saw her half an hour afterwards, there was no trace of muscular agitation. She was sleeping deeply, but with entire quiescence. The respiration was about 70, the pulse 160, the surface very pale, and the expression that of languor and exhaustion.

The mixture given above was suspended, and the following one ordered:— R. Ammoniaci ʒss; assafœtidæ grs. x; pulv. acaciæ ʒii; sacch. alb. ʒi; aquæ menth. virid. ʒiv. M. A teaspoonful every two hours. The mustard application was also suspended, and from fifteen to twenty drops of the following liniment were to be rubbed over the inter-scapular space three times a day. R. Veratriæ grs. v; ol. olivæ, ol. monardæ, acet. opii, aa ʒi. M.

There was no return of the spasm through the day, though the kinks of cough recurred several times with much violence. At 2 P. M. she was awake, looking about naturally, and with perfect intelligence, without heat, but with a good deal of perspiration. The pulse was 144, and the respiration 50. She ate a small piece of gingerbread, but would take nothing else. To take five drops of syrup of ipecac. in each dose of the ammoniac mixture, through the night.

2d.—A bad night, with great restlessness, and frequent, hard cough. In the morning the pulse was 150, and compressible, and the skin hot, but not flushed. The respiration varied between 90 and 104, with much wheezing. While the pulse and respiration continued so frequent, the child was drowsy, and slept for three hours without coughing. No thirst at this time. In the afternoon she became somewhat roused, and in the evening seemed better, the respiration having now fallen to 84, while the pulse continued as before; one stool to-day. Has eaten nothing but two ginger cakes, and has taken no drink, except a little water. Continue the remedies, except the syrup of ipecac.

3d.—Not much change.

4th.—Has had a very good night, sleeping quietly for an hour at a time, without much heat of skin. To-day was passed very comfortably, there being a coughing spell only about once an hour; more appetite.

In the evening I found her sleeping quietly, with the respiration at 48, very quiet, more regular than before, and with much less râle; the pulse was 148, soft, and regular; the skin natural.

Continue the mixture and liniment; a diachylon plaster to be applied over the sternal region.

7th.—On the 5th and the 6th not so well, the pulse having risen to 150—160; the breathing to 60 and 70: there was no appetite, and much restlessness. On the 5th, the ammoniac mixture was suspended, and the following prescription substituted:—R. Pulv. Doveri grs. iii; aluminis grs. vi. M. In chartulas No. vi—one to be given in the evening, and repeated if the cough should be troublesome.

To-day the child is better; the pulse is 136 during sleep, soft, and regular; the respiration 48 to 50, easy, and with less r  le than usual. Yesterday and to-day she has eaten more than before, taking a great deal of calves'-feet jelly, and some ice cream, besides gingerbread; more cheerful; only one stool daily, and that natural. The hooping-cough not more severe, and the catarrhal cough (which has continued between the hooping-cough kinks) less harassing and less frequent. The patient has become quite thin, and yet does not present the emaciation of tuberculous disease: one of the powders in the evening procures a very good night. For the last two days she has been obliged, *by firm persuasion and some insisting*, to take more food than hitherto, and this by my urgent advice.

To continue the powders, liniment, and diet.

14th.—Decided improvement since last note. She has been *obliged* since then to take food, under which method her appetite has improved, until she has now been taking for several days an abundance of nourishment; at breakfast from ten to twelve oysters, and at dinner sweetbread and rice. She has eaten during the last three days some bread and milk also, for the first time in six weeks. The colour of the surface has improved, the palms of the hands showing a faint pink tint, and the cheeks a slight tinge also. The strength is better also, and the temper cheerful. No fever in the last two days, whilst before this there had been every day some hectic flush and heat in the afternoon and evening. The nights have also improved, being now much more quiet, and disturbed only by the cough. The catarrhal cough is now very rare; the hooping-cough spells number from eighteen to twenty-four in the day; much less wheezing in the respiration. This morning, during sleep, the pulse was 116, of good volume, steady, and regular; the respiration was 30, easy, and regular. On the 12th, the percussion was still dull over the upper two-thirds of the left side behind; over the lower third it was flat; in the same region, the respiratory sound was feeble, slightly blowing, and intermingled with mucous, sub-crepitant, and sibilant r  les. Over the right side behind, the percussion was natural, and the respiratory sound full, but mingled with mucous and sub-crepitant r  les. The r  les were, however, much less extensive and abundant than before.

During the last two days the bowels have been opened but once in the twenty-four hours, the stools being natural.

On the 9th, a weak Burgundy pitch-plaster was applied over the posterior and lateral portions of the left side, below the axilla. The diachylon plaster and the liniment were continued. On the 10th, the patient was ordered two drops of the liq. ferri iodidi, three times a day. The Dover's powder and alum still to be given every evening; diet of bread and milk, gingerbread, meat, sweetbread, oysters, jelly, ice-cream, rice; the articles given each day to be varied as the child might fancy; potatoes were forbidden.

April 9th.—The case has been going on well since the last note. On the 7th, the child was taken out for the first time, the weather being warm and dry. To-day I found her running about the room in excellent spirits. She bears exercise much better than before, though it still makes her breathe quickly. During sleep the respiration has been as low as 24; pulse excellent; skin natural; tongue clean; appetite good; the food consisting chiefly

of oysters and sweetbread, gingerbread, and some bread and milk at breakfast and tea. The bowels are generally regular, though still somewhat inclined to feculent diarrhoea. The cough is rare, and the whooping-cough has nearly disappeared.

Auscultation reveals a natural vesicular murmur all over the right side behind, except that there is a slight expiratory sound over the middle and lower portions. Over the left side it is different; above the spine of the scapula the murmur is perfect; over the middle third the respiration is still rather rude, and there is well-marked bronchial expiration; over the lower third, I could hear, at the termination of the inspiration, a fine sub-crepitant râle. The percussion is natural over the right side. Natural above the spine of the left scapula, it becomes duller below that line, and over the lower fourth is very dull.

The plasters were removed five days ago. The iodide of iron to be continued.

April 17th. Constantly improving. Growing fat, and obtaining a clear, good, and ruddy tint in the cheeks. Appetite good; strength much greater. Respiration still hurried after exercise. The cough has nearly ceased. The percussion has greatly improved over the diseased side; over the upper half of that side it is as clear as on the right, while over the lower half it remains yet a little dull. Auscultation reveals a clear and soft vesicular murmur, without prolonged expiration, over the upper half of that side; over the lower half there is still some expiratory blowing, and an imperfect vesicular murmur.

Takes nothing now but the iodide of iron.

Nov. 25th, 1849. I saw the child to-day, looking remarkably well. She has grown in height, and is stout and fat, with a fine healthy complexion. She is perfectly well to all appearances. Percussion yields a clear and unusually sonorous sound over the dorsal region. The vesicular murmur, in the same region, is full and strong.

Nov. 1851. The subject of the above case continues to enjoy good health, with the exception that she takes cold somewhat more readily than most children.

Remarks.—I cannot doubt that the above case was one of bronchitis, combined with collapse of some of the lower portions of the left, and perhaps of some lobules of the right lung, at least after it came under my charge. Prior to that, it is altogether probable that the case was one of pneumonia. The debility which followed the acute symptoms that characterized the early period of the attack, the nature of the general symptoms, the course which the disease followed, the nature of the physical signs, and the good effects obtained from the stimulating treatment pursued, all convince me that the thoracic lesion was a chronic bronchitis accompanying, and probably in part causing, a collapse of a considerable portion of the lower lobe of the left, and of a much smaller portion of the right lung.

The most important point in the treatment was evidently the introduction of nutriment. This was effected by the use of stimulants and tonics, which tended to arouse the dormant digestive energies, and by obliging the patient, for a few days, to swallow considerable quantities of nutritious matter. To accomplish this, it was necessary to use partly actual force, and partly the most urgent entreaties and persuasion. The decided improvement in the case began from the time this plan was adopted; prior to that it had been stationary, or rather retrograding, for a space of about two months.

